



**Individual, independent report as part of
the review by the Pacific hake (*Merluccius
productus*) STAR panel of the Joint US-
Canada Technical Review Panel for the
Pacific Hake/Whiting Stock Assessment.**

Prepared for the Center for Independent Experts

By

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**Cefas Contract
C3804**

COMMERCIAL IN CONFIDENCE

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Executive Summary

- This document is the individual CIE Reviewer report for the Pacific hake/whiting STAR (Stock Assessment Review) Panel meeting provided at the request of the Center for Independent Experts (CIE) (see Appendix 1).
- This report solely represents the views of the independent reviewer (Dr Geoff Tingley).
- This reviewer fully agrees with all of the findings reported in the *Summary STAR Panel Report*. Findings that are fully reported in the Summary Report are not necessarily repeated in this individual report. This report focuses on clarifications of elements in the Summary Report plus some additional views of the individual reviewer that may not have been fully discussed at the meeting.
- A principal finding is that the assessment team met all of the review terms of reference.
- This reviewer believes that there are some significant data issues that need to be addressed in order to improve the quality and reliability of the future assessment of the Pacific hake stock.
- Recommendations aimed at improving the current approach to stock assessment through additional research are made. Readers should refer to the main text for discussion.

Recommendations

Recommendation 1. Where there is a significant issue in either model development, data acquisition or data processing (as occurred this year with the squid occurrence in the 2009 acoustic survey), this should be specifically flagged and made available to the review Panel in advance of the meeting.

Recommendation 2. A detailed analysis of catch, effort, length, and age data by sex, going as far back as possible, and split by fleet, and vessel type, is needed to help understand the commercial data which go into the stock assessment models. In particular, this would enable, (i) defensible length and age frequencies to be constructed by fleet (not just shore-based and at-sea within country), which in turn may enable the modelling of the fisheries data with constant selectivities over time within fleet (or, at least, lead to a reduction in the need for time-varying selectivities); and (ii) abundance indices (i.e. one or more fleet-based CPUE indices) to be explored to provide an alternative (or an addition) to the acoustic survey biomass (should the squid may remain in region and continue to make survey-based hake biomass unreliable and having alternative or additional indices would strengthen the ability of the modellers to adequately assess the hake stock). This should also include additional spatial data describing the tribal and shore-based fisheries. This should be given a high priority as continued overlap in the occurrence of Humboldt squid and the spatial and temporal space of the acoustic survey may compromise the hake biomass estimation from the acoustic survey in future. If this occurs, there will be no adequate available index of biomass to support the assessment going forward.

Recommendation 3. Analysis from all data sources (commercial and research) aimed at understanding the spatial, vertical, and temporal patterns of hake distribution (by length, age, and sex).

Recommendation 4. Analysis from all data sources (commercial and research) aimed at understanding the spatial, vertical, and temporal patterns of Humboldt squid distribution (by length, age, and sex).

Recommendation 5. Research into the appropriateness of attempting to produce biomass estimates at length, age, and sex, from acoustic surveys of semi-demersal species such as hake and pollock, including in the presence of possible confounding species such as Humboldt squid and lingcod. Once the work has been done (by statistician(s) with practical fisheries experience, in conjunction with acousticians) convene a workshop to discuss and review the findings. Ideally this should also address the issue of adequately sampling to ground-truth the acoustic estimates, including, for example, duration of trawl sampling, using a commercial trawler to sample, using another (additional) gear type to sample).

Recommendation 6. Provide an option in SS3 to disable or severely limit the penalty on recruitment deviations while maintaining internal consistency in the definition of B_0 .

Recommendation 7. Place a very high priority on obtaining a defensible length to target strength relationship for hake.

Recommendation 8. Place a high priority on obtaining a defensible length to target strength relationship for Humboldt squid and assessing available techniques to acoustically distinguish between hake and squid biomass in the field.

Recommendation 9. Construct informed priors for the acoustic qs associated with the existing time series (this will ensure that future model runs stay in sensible space, or alternatively, that the estimates will be a revealing diagnostic).

Introduction

This STAR Panel was focused on providing continuing support to the process of developing the best approaches to assessment for management of this important species by review.

All presenters provided clear and informative material and were constructive and helpful in providing clarifications. The overall tone of the meeting was positive and constructive.

Description of review activities

This review was undertaken by Dr Geoff Tingley in Seattle, WA over the period 8th-10th February 2010 as part of the Pacific hake STAR Panel. Relevant documents (see bibliography, Appendix 1) were made available between one and two weeks prior to the STAR meeting via a link to an ftp server. The documentation was reviewed prior to the meeting.

The background information and assessment of Pacific hake/whiting was presented by various STAT team members, lead by Owen Hamel (NMFS), Ian Stewart (NMFS), Chris Grandin (DFO) and Steve Martell (UBC for DFO).

Background information relevant o this review are presented in a series of appendices, including a bibliography (A1); CIE Statement of Work (A2); report format (A3); meeting participants (A4); Terms of Reference (A5); and meeting agenda as supplied (A6).

Comments are provided against the specific terms of reference (ToR) (Appendix 5) and are those of this independent reviewer only.

Summary of findings

The assessment teams should be commended for their thorough and professional approach to developing and applying the two models to provide the best advice to managers under considerable time constraints. The openness of the discussions and breadth of information presented during the review greatly aided the review process. A summary of findings and recommendations from this reviewer are presented below.

The findings of this reviewer are reported within relevant sections, addressing the seven main areas of the Terms of Reference (Appendix 1). Numbered recommendations refer to the correspondingly numbered items within the conclusions and recommendations section of this report.

Where no recommendations are made against a specific ToR, this is because the reviewer believes that the STAR Summary Report has made the appropriate recommendations in full or none are required.

Overall findings

The reviewer fully agrees with all of the findings reported in the Joint U.S.-Canada STAR Panel Report (STAR Summary Report). Findings that are fully reported in the Summary Report are not necessarily repeated in this individual report. This report focuses on clarifications of elements in the Summary Report plus some additional views of the individual reviewer that may not have been fully discussed by the meeting or STAR Panel.

The principal finding is that the assessment team met all of the terms of reference of the review.

ToR 1. Become familiar with the draft Pacific hake/whiting stock assessment(s) and background materials

Relevant and appropriate documentation on the background, data and models was provided in an electronic format via an ftp server before the meeting. This material was reviewed prior to the meeting. Additional electronic and some paper material were also made available during the meeting, as required or requested. The quality of the written material was high.

The only significant area not covered by the material made available in advance of the meeting was information about the 2009 acoustic survey. Whilst in normal years, this would not necessarily be required, due to presence of large numbers of Humboldt squid (*Dosidicus gigas*), and the impact that this had on the hake biomass estimate, the review process would have benefited from the STAR Panel members having an earlier awareness of the survey and these associated issues (Recommendation 1).

ToR 2. Comment on the quality of data used in the assessment(s) including data collection and processing

Overall the quantity, quality and variety of data available to the assessment teams was high and appropriate for the needs of the assessment of the hake stock.

The current review of the series of acoustic surveys to draw these together into a proper time series is to be commended.

There were issues of suitability of some data included in the assessment models and this was discussed in the STAR Summary report. Five issues were of concern, all associated with the appropriateness of data included in the assessments. There were:

- a) The ‘corrected’ hake biomass estimate from the 1986 acoustic survey: problems with the calibration of this survey mean that there is no reliable estimate for this survey and none should be used in the assessments now or in future. This data point was also removed from the assessment by a previous STAR in 2004.
- b) The hake biomass estimate from the 2009 acoustic survey was compromised by unusually high numbers of squid. This essentially means that no adequate estimate of hake biomass could be derived from this survey for use in the biomass time series and including ‘minimum’ estimates or estimates based on arbitrary rules to separate hake from squid backscatter are inappropriate.
- c) The acoustic survey is currently generating the only usable biomass index series to support the assessment, yet there are considerable amounts of information within the commercial catch and effort data that are currently unused in these assessments. Should the Humboldt squid continue to create problems with the acoustic survey (and there is no reason to believe that this will not be the case), it would be wise to explore other possible indices based on, for example, CPUE.
- d) The inclusion of both length and age frequency data from the catch sampling programme into the assessments when the models calculate age frequency from length frequency.
- e) The inclusion of age frequency and length frequency data from the trawl sampling of the series of acoustic surveys. Trawl samples are principally collected during acoustic surveys in order to groundtruth the origin of backscatter to specific species of fish or plankton. The protocol for deploying and recovering the trawl during acoustic surveys (essentially an opportunistic decision making process) is specifically designed to answer questions about what species are in specific layers or in specific marks and whether layers/marks are composed of mixed species. There is no random or design approach to defining which spatial or depth strata are sampled or to tow duration or profile. Thus, the biological samples produced cannot be representative of the survey area or the populations being surveyed. It is, therefore, inappropriate to use these data in the assessments, especially when other, appropriate length and age frequency data from statistically robust data collection programs from within the fishery are available.

There was some concern expressed from within the acoustic team that the STAR Panel, due to the concerns raised about the inclusion of data outlined in (a), (b) and (e) above, was being critical of the work of the acoustic team. This was categorically not the case. The STAR Panel was very supportive of the efforts and approaches that the acoustic team were putting in and, given that the acoustic time-series is the only available biomass index, consider the acoustic time series and its continued collection as critical. This reviewer specifically engaged individually with members of the acoustic team to reassure them of the value that the STAR Panel placed on the survey and the lack of criticism of the acoustic team activities and that the issue of concern was how some of the data was used in the assessments.

ToR 3. Evaluate and comment on analytic methodologies

ToR 3 is considered together with ToR 4 below.

ToR 4. Evaluate model assumptions, estimates, and major sources of uncertainty and provide constructive suggestions for improvements if technical deficiencies or additional major sources of uncertainty are identified

The technical merits and deficiencies were fully discussed and are clearly presented in the Summary Report.

TINSS: Technical merits

- A reasonably well tested model as it has been used for a number of years and has been peer reviewed on each occasion.
- Has the advantage of relative simplicity in terms of population dynamics.
- Explicitly accounts for observation and process error
- Integrates major aspects of uncertainty through Bayesian estimation.

SS3: Technical merits

- Developed using a well tested and documented package
- Has separate US and Canadian fisheries and associated selectivities
- Attempts to account for changes in fishery selectivity over time in both fisheries

TINSS: Technical deficiencies

- Some of the technical aspects of the model are not well understood by many stock assessment scientists (because it is a relatively unusual model in the stock assessment context); hence the level of peer review it has received may not be as in-depth as it could be.
- Similarly, the suite of suitable model diagnostics is not as well-developed as for a “standard” observation error model (such as SS3).
- The age frequencies may not be properly weighted because of stratification issues and the aggregation into a single fishery.
- There is no mechanism to compensate for possible changes in fishery selectivity.
- The model does not have informed priors for the acoustic q_s which limits our ability to judge the plausibility of the estimated size of the stock

SS3: Technical deficiencies

- The model may be over-parameterized due to the extensive blocking structure which attempts to compensate for possible changes in fishery selectivities.
- Some of the supposedly un-informative priors on selectivity parameters may actually be highly informative
- The age frequencies may not be properly weighted because of stratification issues.
- The model reviewed by the Panel does not integrate uncertainty through Bayesian estimation (the Bayesian run is not available to the Panel before the finalization of this report due to time constraints).
- The model does not have informed priors for the acoustic q_s which limits our ability to judge the plausibility of the estimated size of the stock.

The descriptions of the technical deficiencies are so worded as to address how to correct them.

ToR 5. Determine whether the science reviewed is considered to be the best scientific information available

The science, in terms of the approach to model development, is of a very high standard. There are issues of over parameterization, especially in SS3 that suggests a more parsimonious approach would be beneficial.

The collection and processing of the basic fisheries data is excellent as are the programs for collecting survey data in various forms. Given the comments under ToR 2, there does appear to be an issue of lower scientific quality in the decision making process of selecting which data to include within the assessments.

ToR 6. Provide specific suggestions for future improvement in any relevant aspects of data collection and treatment, modeling approaches and technical issues

There were a number of issues discussed by the Panel relevant to improving data collection modeling approaches and technical issues. These have been fully presented in the Summary report. Within this report, these issues are considered under other, more appropriate ToRs.

ToR 7. Provide a brief description on panel review proceedings highlighting pertinent discussions, issues, effectiveness, and recommendations.

The review proceedings were conducted in an open, constructive and friendly manner throughout. There was a minor issue relating to the acoustic data that was largely due to a misunderstanding about what was being criticised (use of data rather than the quality of the data or scientific approach).

Significant time was spent considering the input data as both individuals on the Panel and the Panel as whole had concerns about the quality and appropriateness of some of the input data. The details of this are presented under ToR 2 above.

There was discussion about the expansion applied to the earlier years of the acoustic survey and the appropriateness of this, suggesting that there were in fact two acoustic biomass time series rather than a single one.

Two issues of concern in the catch data were fully discussed, the stratification and scaling of the catch compositions and aspects of how the growth of young fish during the fishing season is captured and fed into the model.

A range of model technicalities were discussed and have fully described in the Summary Report.

After the close of the meeting some of those present at during the meeting expressed increased concern about the removal of some of the (large) datasets from the assessment as described under ToR 2 above. This did not influence either the Summary Report of the STAR Panel, or the individual report of this reviewer.

Conclusions and Recommendations

Conclusions

The Panel was unanimous in its final evaluation of the presented base models and selection of preferred versions. There were no significant disagreements within the STAR Panel. The STAT teams were specifically asked whether they disagreed with the approach that the STAR Panel was recommending and no disagreement was reported between the STAT teams and the STAR Panel.

Most recommendations identified by this reviewer as needed appear in the Summary Report.

Recommendations (by ToR)

ToR 1. Become familiar with the draft Pacific hake/whiting stock assessment(s) and background materials

Recommendation 1. Where there is a significant issue in either model development, data acquisition or data processing (as occurred this year with the squid occurrence in the 2009 acoustic survey) this should be specifically flagged and made available to the review Panel in advance of the meeting.

ToR 2. Comment on the quality of data used in the assessment(s) including data collection and processing

No recommendations under this ToR.

ToR 3. Evaluate and comment on analytic methodologies

No recommendations under this ToR.

ToR 4. Evaluate model assumptions, estimates, and major sources of uncertainty and provide constructive suggestions for improvements if technical deficiencies or additional major sources of uncertainty are identified

No recommendations under this ToR.

ToR 5. Determine whether the science reviewed is considered to be the best scientific information available

No recommendations under this ToR.

ToR 6. Provide specific suggestions for future improvement in any relevant aspects of data collection and treatment, modeling approaches and technical issues

Recommendation 2. A detailed analysis of catch, effort, length, and age data by sex, going as far back as possible, and split by fleet, and vessel type, is needed to help understand the commercial data which go into the stock assessment models. In particular, this would enable, (i) defensible length and age frequencies to be constructed by fleet (not just shore-based and at-sea within country), which in turn may enable the

modelling of the fisheries data with constant selectivities over time within fleet (or, at least, lead to a reduction in the need for time-varying selectivities); and (ii) abundance indices (i.e. one or more fleet-based CPUE indices) to be explored to provide an alternative (or an addition) to the acoustic survey biomass (should the squid may remain in region and continue to make survey-based hake biomass unreliable and having alternative or additional indices would strengthen the ability of the modellers to adequately assess the hake stock). This should also include additional spatial data describing the tribal and shore-based fisheries. This should be given a high priority as continued overlap in the occurrence of Humboldt squid and the spatial and temporal space of the acoustic survey may compromise the hake biomass estimation from the acoustic survey in future. If this occurs, there will be no adequate available index of biomass to support the assessment going forward.

Recommendation 3. Analysis from all data sources (commercial and acoustic survey) aimed at understanding the spatial, vertical, and temporal patterns of hake distribution (by length, age, and sex).

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Recommendation 8. Place a high priority on obtaining a defensible length to target strength relationship for Humboldt squid and assessing available techniques to acoustically distinguish between hake and squid biomass in the field.

Recommendation 9. Construct informed priors for the acoustic qs associated with the existing time series (this will ensure that future model runs stay in sensible space, or alternatively, that the estimates will be a revealing diagnostic).

ToR 7. Provide a brief description on panel review proceedings highlighting pertinent discussions, issues, effectiveness, and recommendations

No recommendations under this ToR.

Appendix 1: Bibliography

Availability	Title	Authors
Advance	Parameterization age-structured models from a fisheries management perspective (2008).	Martell, Pine & Walters
Advance	Stock Assessment of Pacific Hake <i>Merluccius productus</i> (a.k.a. Whiting) in U.S. and Canadian waters in 2008.	Helser, Stewart & Hamel
Advance	Report of the 2008 US / Canada Pacific Hake (Whiting) Stock Assessment Review (STAR) Panel.	Sampson, Haddon, Cadigan, Waldeck & Wallace (STAR Panel)
Advance	Minority Report to the 2008 Pacific Hake STAR Panel Report.	Sinclair, Martell, Grandin & Fargo
Advance	Assessment and Management advice for Pacific hake in U.S. and Canadian waters in 2009	Martell
Advance	Pacific Whiting The Joint U.S. - Canada STAR Panel Report.	Sampson, Hall, Helge-Volstad & Carruthers (STAR Panel)
Advance	Stock Assessment of Pacific Hake, <i>Merluccius productus</i> , (a.k.a. Whiting) in U.S. and Canadian Waters in 2009	Hamel & Stewart
Advance	The 2005 Integrated Acoustic and Trawl Survey of Pacific Hake, <i>Merluccius productus</i> , in U.S. and Canadian Waters off the Pacific Coast	Fleischer, Cooke, Ressler, Thomas, de Blois, & Hufnagle
Advance	Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (P.L. 109-479). Title VI -Pacific Whiting	Anon.
Advance	Agreement between the Government of the United States of America and the Government of Canada on Pacific Hake/Whiting (the “Agreement”), Done at Seattle, November 21, 2003	Anon.
Advance	Stock Assessment of Pacific Hake, <i>Merluccius productus</i> , (a.k.a. Whiting) in U.S. and Canadian Waters in 2010	Stewart & Hamel
Advance	Terms of Reference for the Groundfish Stock Assessment and Review Process for 2009-2010	Anon.
Advance	Assessment and Management advice for Pacific hake in U.S. and Canadian waters in 2010	Martell
Advance	User Manual for Stock Synthesis Model Version 3.10	Methot
Advance	Integrated Acoustic and Trawl Survey: Design, Method, and Analysis	Dezhang & Thomas
Advance	Addendum to the Report of the 2008 US / Canada Pacific Hake (Whiting) Stock Assessment Review (STAR) Panel – STAR Panel Response to the Minority Report.	Sampson, Haddon and Cadigan (STAR Panel members)
Advance	Assessment and Management advice for Pacific hake in U.S. and Canadian waters in 2008.	Martell
Advance	Canadian Fishery Distribution, Index Analysis, and Virtual population Analysis of Pacific Hake, 2008.	Sinclair & Grandin
Day 1	Canadian Pacific Hake Overview (PowerPoint)	Grandin
Day 1	The 2009 U.S. Whiting Fishery	Stewart
Day 1	Data available for the 2010 Pacific hake assessment	Stewart
Day 1	2010 Pacific Hake Model and Assessment	Hamel & Stewart
Day 1	Integrated acoustic and trawl survey: design, method and analysis	Anon.
Day 1	2009 Joint U.S. – Canada Pacific Hake Acoustic Survey	Anon.
Day 1	Planned and on-going analysis	Dezhang
Day 2	Assessment and management advice for Pacific hake in U.S. Canadian waters in 2010	Martell

Some additional, particularly graphic, material was presented during the meeting, either at the request of the STAR Panel or because the STAT team considered that it would be helpful to address a specific issue.

Appendix 2: Statement of Work

Attachment A: Statement of Work for Dr. Geoff Tingley (Cefas)

External Independent Peer Review by the Center for Independent Experts

Joint US-Canada Technical Review Panel for the Pacific Whiting Stock Assessment

Scope of Work and CIE Process: The National Marine Fisheries Service's (NMFS) Office of Science and Technology coordinates and manages a contract providing external expertise through the Center for Independent Experts (CIE) to conduct independent peer reviews of NMFS scientific projects. The Statement of Work (SoW) described herein was established by the NMFS Project Contact and Contracting Officer's Technical Representative (COTR), and reviewed by CIE for compliance with their policy for providing independent expertise that can provide impartial and independent peer review without conflicts of interest. CIE reviewers are selected by the CIE Steering Committee and CIE Coordination Team to conduct the independent peer review of NMFS science in compliance the predetermined Terms of Reference (ToRs) of the peer review. Each CIE reviewer is contracted to deliver an independent peer review report to be approved by the CIE Steering Committee and the report is to be formatted with content requirements as specified in **Annex 1**. This SoW describes the work tasks and deliverables of the CIE reviewer for conducting an independent peer review of the following NMFS project. Further information on the CIE process can be obtained from www.ciereviews.com.

Project Description: The Pacific hake (or whiting, *Merluccius productus*) stock assessment will provide the basis for the management of the largest groundfish fisheries off the West Coast of the U.S. and British Columbia. In 2008, Pacific whiting fishery accounted for 89% of the landed catch and 52% of the associated ex-vessel value in the U.S. groundfish fishery. In addition, the treaty between the U.S. and Canada which establishes an annual assessment and management process is expected to be ratified sometime soon. The technical review will take place during a formal, public, multiple-day meeting of fishery stock assessment experts. Participation of external, independent reviewer is an essential part of the review process. The Terms of Reference (ToRs) of the peer review are attached in **Annex 2**. The tentative agenda of the panel review meeting is attached in **Annex 3**.

Requirements for CIE Reviewers: Two CIE reviewers shall conduct an impartial and independent peer review in accordance with the SoW and ToRs herein. CIE reviewers shall have working knowledge and recent experience in the application of fish population dynamics, with experience in the integrated analysis modeling approach, using age-and size-structured models, use of MCMC to develop confidence intervals, and use of Generalized Linear Models in stock assessment models. Each CIE reviewer's duties shall not exceed a maximum of 14 days to complete all work tasks of the peer review described herein.

Location of Peer Review: Each CIE reviewer shall conduct an independent peer review during the panel review meeting tentatively scheduled in Seattle, Washington during February 8- 10, 2010.

Statement of Tasks: Each CIE reviewers shall complete the following tasks in accordance with the SoW and Schedule of Milestones and Deliverables herein.

Prior to the Peer Review: Upon completion of the CIE reviewer selection by the CIE Steering Committee, the CIE shall provide the CIE reviewer information (full name, title, affiliation, country, address, email) to the COTR, who forwards this information to the NMFS Project Contact no later the date specified in the Schedule of Milestones and Deliverables. The CIE is responsible for providing the SoW and ToRs to the CIE reviewers. The NMFS Project Contact is responsible for providing the CIE reviewers with the background documents, reports, foreign national security clearance, and other information concerning pertinent meeting arrangements. The NMFS Project Contact is also responsible for providing the Chair a copy of the SoW in advance of the panel review meeting. Any changes to the SoW or ToRs must be made through the COTR prior to the commencement of the peer review.

Foreign National Security Clearance: When CIE reviewers participate during a panel review meeting at a government facility, the NMFS Project Contact is responsible for obtaining the Foreign National Security Clearance approval for CIE reviewers who are non-US citizens. For this reason, the CIE reviewers shall provide requested information (e.g., first and last name, contact information, gender, birth date, passport number, country of passport, travel dates, country of citizenship, country of current residence, and home country) to the NMFS Project Contact for the purpose of their security clearance, and this information shall be submitted at least 30 days before the peer review in accordance with the NOAA Deemed Export Technology Control Program NAO 207-12 regulations available at the Deemed Exports NAO website: <http://deemedexports.noaa.gov/sponsor.html>).

Pre-review Background Documents: Two weeks before the peer review, the NMFS Project Contact will send (by electronic mail or make available at an FTP site) to the CIE reviewers the necessary background information and reports for the peer review. In the case where the documents need to be mailed, the NMFS Project Contact will consult with the CIE Lead Coordinator on where to send documents. CIE reviewers are responsible only for the pre-review documents that are delivered to the reviewer in accordance to the SoW scheduled deadlines specified herein. The CIE reviewers shall read all documents in preparation for the peer review.

Panel Review Meeting: Each CIE reviewer shall conduct the independent peer review in accordance with the SoW and ToRs, and shall not serve in any other role unless specified herein. **Modifications to the SoW and ToRs can not be made during the peer review, and any SoW or ToRs modifications prior to the peer review shall be approved by the COTR and CIE Lead Coordinator.** Each CIE reviewer shall actively participate in a professional and respectful manner as a member of the meeting review panel, and their peer review tasks shall be focused on the ToRs as specified herein. The NMFS Project Contact is responsible for any facility arrangements (e.g., conference room for panel review meetings or teleconference arrangements). The NMFS Project Contact is responsible for ensuring that the Chair understands the contractual role of the CIE reviewers as specified herein. The CIE Lead Coordinator can contact the Project Contact to confirm any peer review arrangements, including the meeting facility arrangements.

Contract Deliverables - Independent CIE Peer Review Reports: Each CIE reviewer shall complete an independent peer review report in accordance with the SoW. Each CIE reviewer shall complete the independent peer review according to required format and content as described in Annex 1. Each CIE reviewer shall complete the independent peer review addressing each ToR as described in Annex 2.

Other Tasks – Contribution to Summary Report: Each CIE reviewer may assist the Chair of the panel review meeting with contributions to the Summary Report, based on the terms of reference of the review. Each CIE reviewer is not required to reach a consensus, and should provide a brief summary of the reviewer’s views on the summary of findings and conclusions reached by the review panel in accordance with the ToRs.

Specific Tasks for CIE Reviewers: The following chronological list of tasks shall be completed by each CIE reviewer in a timely manner as specified in the **Schedule of Milestones and Deliverables**.

- 1) Conduct necessary pre-review preparations, including the review of background material and reports provided by the NMFS Project Contact in advance of the peer review.
- 2) Participate during a panel review meeting in Seattle, Washington during 8-10 February 2010 as specified herein, and conduct an independent peer review in accordance with the ToRs (**Annex 2**).
- 3) No later than REPORT SUBMISSION DATE, each CIE reviewer shall submit an independent peer review report addressed to the “Center for Independent Experts,” and sent to Mr. Manoj Shivlani, CIE Lead Coordinator, via email to shivlanim@bellsouth.net, and CIE Regional Coordinator, via email to David Die ddie@rsmas.miami.edu. Each CIE report shall be written using the format and content requirements specified in Annex 1, and address each ToR in **Annex 2**.

Schedule of Milestones and Deliverables: CIE shall complete the tasks and deliverables described in this SoW in accordance with the following schedule.

The schedule below is tentative, and the NMFS Project Contact will confirm the dates of the panel review meeting by 15 October 2009.

4 January 2009	CIE sends reviewer contact information to the COTR, who then sends this to the NMFS Project Contact
25 January 2010	NMFS Project Contact sends the CIE Reviewers the pre-review documents
8-10 February 2010	Each reviewer participates and conducts an independent peer review during the panel review meeting
24 February 2010	CIE reviewers submit draft CIE independent peer review reports to the CIE Lead Coordinator and CIE Regional Coordinator
10 March 2010	CIE submits CIE independent peer review reports to the COTR
17 March 2010	The COTR distributes the final CIE reports to the NMFS Project Contact and regional Center Director

Modifications to the Statement of Work: Requests to modify this SoW must be approved by the Contracting Officer at least 15 working days prior to making any permanent substitutions. The Contracting Officer will notify the COTR within 10 working days after receipt of all required information of the decision on substitutions. The COTR can approve

changes to the milestone dates, list of pre-review documents, and ToRs within the SoW as long as the role and ability of the CIE reviewers to complete the deliverable in accordance with the SoW is not adversely impacted. The SoW and ToRs shall not be changed once the peer review has begun.

Acceptance of Deliverables: Upon review and acceptance of the CIE independent peer review reports by the CIE Lead Coordinator, Regional Coordinator, and Steering Committee, these reports shall be sent to the COTR for final approval as contract deliverables based on compliance with the SoW and ToRs. As specified in the Schedule of Milestones and Deliverables, the CIE shall send via e-mail the contract deliverables (CIE independent peer review reports) to the COTR (William Michaels, via William.Michaels@noaa.gov).

Applicable Performance Standards: The contract is successfully completed when the COTR provides final approval of the contract deliverables. The acceptance of the contract deliverables shall be based on three performance standards:

- (1) each CIE report shall be completed with the format and content in accordance with **Annex 1**,
- (2) each CIE report shall address each ToR as specified in **Annex 2**,
- (3) the CIE reports shall be delivered in a timely manner as specified in the schedule of milestones and deliverables.

Distribution of Approved Deliverables: Upon acceptance by the COTR, the CIE Lead Coordinator shall send via e-mail the final CIE reports in *.PDF format to the COTR. The COTR will distribute the CIE reports to the NMFS Project Contact and Center Director.

Key Personnel:

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Appendix 3: Format and Contents of CIE Independent Peer Review Report

Appendix 2. Format and Contents of CIE Independent Peer Review Report

1. The CIE independent report shall be prefaced with an Executive Summary providing a concise summary of the findings and recommendations, and specify whether the science reviewed is the best scientific information available.
2. The main body of the reviewer report shall consist of a Background, Description of the Individual Reviewer's Role in the Review Activities, Summary of Findings for each ToR in which the weaknesses and strengths are described, and Conclusions and Recommendations in accordance with the ToRs.
 - a. Reviewers should describe in their own words the review activities completed during the panel review meeting, including providing a brief summary of findings, of the science, conclusions, and recommendations.
 - b. Reviewers should discuss their independent views on each ToR even if these were consistent with those of other panelists, and especially where there were divergent views.
 - c. Reviewers should elaborate on any points raised in the Summary Report that they feel might require further clarification.
 - d. Reviewers shall provide a critique of the NMFS review process, including suggestions for improvements of both process and products.
 - e. The CIE independent report shall be a stand-alone document for others to understand the weaknesses and strengths of the science reviewed, regardless of whether or not they read the summary report. The CIE independent report shall be an independent peer review of each ToRs, and shall not simply repeat the contents of the summary report.
3. The reviewer report shall include the following appendices:
 - Appendix 1: Bibliography of materials provided for review
 - Appendix 2: A copy of the CIE Statement of Work
 - Appendix 3: Panel Membership or other pertinent information from the panel review meeting.

Appendix 4: Participants

Participants for the Joint US-Canadian Review Panel of the Pacific hake / Whiting Stock Assessment

February 8-10, 2010,
Hotel Deca
4507 Brooklyn Avenue N.E.
Seattle, WA 98105

Technical Reviewers

Vidar Wespestad, Scientific and Statistical Committee (SSC), Panel Chair
Geoff Tingley, Center for Independent Experts (CIE)
Patrick Cordue, Center for Independent Experts (CIE)
Tom Carruthers, University of British Columbia (UBC)

Panel Advisors

John DeVore, Pacific Fishery Management Council (PFMC) Staff
Tom Libby, PFMC Groundfish Advisory Sub-panel (GAP)
Jason Cope, PFMC Groundfish Management Team (GMT)
Greg Workman, Department of Fisheries and Oceans (DFO)
Chris Grandin - Department of Fisheries and Oceans (DFO)
Robyn Forrest - Department of Fisheries and Oceans (DFO)

Stock Assessment (STAT) Team

Owen Hamel and Ian Stewart, National Marine Fisheries Service (NMFS)
Steve Martell, University of British Columbia (UBC)

Appendix 5: Terms of Reference for the Peer Review

Joint US-Canada Technical Review Panel for the Pacific Whiting Stock Assessment

1. Become familiar with the draft Pacific hake/Whiting stock assessment(s) and background materials.
2. Comment on the quality of data used in the assessment(s) including data collection and processing.
3. Evaluate and comment on analytic methodologies.
4. Evaluate model assumptions, estimates, and major sources of uncertainty and provide constructive suggestions for improvements if technical deficiencies or additional major sources of uncertainty are identified.
5. Determine whether the science reviewed is considered to be the best scientific information available.
6. Provide specific suggestions for future improvement in any relevant aspects of data collection and treatment, modeling approaches and technical issues.
7. Provide a brief description on panel review proceedings highlighting pertinent discussions, issues, effectiveness, and recommendations

Note – CIE reviewers typically address scientific subjects, hence ToRs usually do not involve CIE reviewers with regulatory and management issues unless this expertise is specifically requested in the SoW.

The NMFS Project Contact will provide the Terms of Reference by 6 January 2010.

Appendix 6: Tentative Agenda

Tentative Agenda

Joint US-Canada Technical Review Panel for the Pacific Hake / Whiting Stock Assessment

February 8-10, 2010

Hotel Decca

4507 Brooklyn Avenue NE

Seattle, WA 98105

Monday, February 8, 2010

- 9:00 a.m. Welcome and Introductions (Stacey Miller or Jim Hastie, NMFS).
Review the Status of the Pacific hake / Whiting Treaty
- 9:15 a.m. Review the Meeting Agenda (Panel Chair, SSC rep.).
Review Terms of Reference for Assessments and Review Meeting
Assignment of reporting duties
- 9:45 a.m. Data Presentations
- Overview of the 2009 Hake/Whiting Fisheries
 - o Canadian Waters (Chris Grandin, DFO)
 - o U.S. Waters (Ian Stewart, NMFS)
- 10:15 a.m. Coffee Break
- 10:45 a.m. Data Presentations Continued
- Acoustic Survey: Design and Analysis (NMFS)
- 12:00 p.m. Lunch (on your own)
- 1:00 p.m. Data Presentations Continued
- Acoustic Survey: 2009 Results (NMFS)
- 2:00 p.m. Data Presentations Continued
- Acoustic Survey: On-going Analyses (NMFS)
- 3:00 p.m. Coffee Break
- 3:30 p.m. Overview of the Data Sources for the 2010 Assessment (Ian Stewart and Owen Hamel, NMFS)
- 5:30 p.m. Adjourn for the day.

Tuesday, February 9, 2010

- 9:00 a.m. STAT Model Presentations
- Stock Synthesis Model Description and Results (Owen Hamel and Ian Stewart, NMFS)
 - TINSS Model Description and Results (Steve Martell, UBC)
- 12:00 p.m. Lunch On Your Own

- 1:00 p.m. Q&A session with the STATs
- Panel develops list of model runs / analyses for the STAT(s).
- 5:30 p.m. Adjourn for day.

Wednesday, February 10, 2010

- 9:00 a.m. STAT presentation(s) of requested model runs/analyses.
- 10:00 a.m. Panel Discussion
- Finalize base case model results, discuss structure of decision table and reporting of uncertainty
- 12:00 p.m. Lunch On Your Own.
- 1:00 p.m. Panel Drafts STAR Report.
- Agree to process for completing final STAR report by Council Briefing Book deadline (Feb. 17th for mailed BB).
- 5:30 p.m. Review Panel Adjourn.



Cefas

